May 27, 2015

Ex. 6 - Personal Privacy

Response to Correspondence Received Regarding Arsenic and Uranium in Hinkley, San Bernardino County

Water Board staff has received several pieces of recent correspondence from you: letters dated April 30 and May 7, 2015; and emails dated May 4 and May 6, 2015. This letter responds to comments and concerns in your correspondence.

I. ARSENIC AND URANIUM LEVELS IN DOMESTIC WELLS IN HINKLEY AREA

Your letters and emails express concerns related to arsenic and uranium levels in wells in the Hinkley area. You assert that PG&E's remedial actions have caused such constituents in the aquifer in the Hinkley area and that the Water Board has delayed disclosure of facts or intentionally concealed or failed to warn of facts (related to levels of arsenic and uranium in the Hinkley aquifer).

Water Board staff have disclosed and discussed arsenic and uranium data as we receive or become aware of it; for example, information on arsenic and uranium is disclosed in many publically-available documents produced by both the Water Board and PG&E. These documents are available online at the State Water Resources Control Board's Geotracker database at:
http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL0607111288

or the Lahontan Water Board PG&E Hinkley Cleanup Project webpage at:
http://www.waterboards.ca.gov/lahontan/water_issues/projects/pge/index.shtml.

A partial listing of available documents includes:

- 2013 *Environmental Impact Report for Comprehensive Cleanup of Chromium in Groun*dwater (see, for example, section 3.1, Water Quality; Mitigation Measure WTR-MM-2b, "Water Supply Program for Wells Affected by Remedial Byproducts"; Mitigation Measure WTR-MM-5 "Investigate and Monitor TDS, Uranium and other Radionuclides in relation to Agricultural Treatment and Take

Contingency Actions"). Available at http://www.waterboards.ca.gov/lahontan/water_issues/projects/pge/feir.shtml.

- Water Board Investigative Order No. R6V-2012-0057, *Request for Uranium and Gross Alpha and Beta Data*, issued to PG&E on November 2, 2012.

- *Radionuclide Summary Report*, dated November 30, 2012, submitted by PG&E in response to Investigative Order No. R6V-2012-0057.

- Agricultural Treatment Unit Waste Discharge Requirements (Board Order No. R6V-2014-0023) *Groundwater Monitoring Reports*, submitted quarterly by PG&E since November 2013, containing data on uranium (among other constituents) in domestic and monitoring wells and soils in Hinkley.

- In-situ remediation zone (IRZ) Groundwater Monitoring Reports, submitted quarterly by PG&E since 2006 containing data on arsenic (among other constituents) in monitoring wells in Hinkley. The most recent report from First Quarter 2015 states that arsenic did not exceed drinking water standards in IRZ monitoring wells.

- PG&E's amended October 5, 2012 *Whole House Replacement Water Report*, dated March 1, 2013, reporting arsenic and radionuclide sampling data for domestic wells in the replacement water program.

- *Southern Agricultural Treatment Unit Water Quality*, dated February 25, 2015, submitted by PG&E, reporting irrigation and receiving water quality, including for arsenic and uranium, at the new agricultural treatment units (ATUs) near the compressor station (see tables 1 and 2).

We require monitoring for arsenic and uranium in waste discharge permits issued to PG&E by the Water Board for its remediation activities. Both arsenic and uranium occur naturally in soils and rocks in the Hinkley area. A discussion of how naturally-occurring arsenic and uranium levels could be affected by PG&E's remediation actions, and what the Water Board requires of PG&E regarding monitoring, investigating, and mitigating any impacts to domestic wells, is provided below.

Uranium

As stated in the Environmental Impact Report (EIR) prepared for the Hinkley chromium groundwater cleanup project (see, for example, pages 3.1-41 through 43), uranium is not a constituent associated with PG&E's waste discharge (uranium or its byproducts were not and are not used by PG&E in its compressor station operations, nor is uranium added to the groundwater by PG&E as part of injection of ethanol, fresh water or other compounds). Uranium is a naturally occurring radioactive element in rocks, soil, water, and plants. Naturally occurring uranium (approximately 4 parts per million) has been found in rocks in a number of locations in the Mojave Desert. Uranium and other naturally occurring radioactive materials have been detected in the Mojave River

Groundwater Basin and are likely attributed to the mineralogy of the granitic rocks observed in the lower regional aquifer.

However, under the Water Board's regulatory authority, if PG&E's remediation actions could result in discharging naturally-occurring constituents to areas where they would not have migrated to otherwise (such as to ground, or to different portions of an aquifer such that domestic wells are impacted), then the Water Board can require PG&E to monitor, investigate and clean up those impacts. In 2011, during the development of the EIR, Water Board staff became aware of a study on groundwater pumping effects on uranium levels in the San Joaquin Valley of California. In that study, a possible link was found between increased pumping for summer agricultural irrigation and the mobilization of naturally-occurring uranium to deeper aquifers tapped by irrigation supply wells (Jurgens et al [2009]. *Case Study: Effects of Groundwater Development on Uranium: Central Valley, California, USA*. National Groundwater Association and U.S. Geological Survey, California Water Science Center). Around that time, PG&E sampled several newly-acquired irrigation wells north of Highway 58 for water quality constituents, including uranium and other radionuclides. The results were reported to the Water Board in agricultural unit monitoring reports and indicated concentrations of uranium above maximum contaminant levels.

Water Board staff responded to this information in three ways:

1) In the EIR, the Water Board identified this potential for mobilizing uranium due to agricultural pumping as a potentially significant and unavoidable impact (see impact WTR-2e discussion starting on EIR page 3.1-90), and specified investigation and monitoring to determine if this was in fact occurring, or could occur in the future due to PG&E's remediation actions (see associated mitigation measures discussion starting on EIR page 3.1-109, particularly mitigation measures WTR-MM-2, -2b,- 2c,- 4, and- 5).

2) To implement the EIR requirements for uranium, the Water Board issued the Agricultural Treatment Unit Waste Discharge Requirements (ATU permit) in March 2014 requiring PG&E to sample domestic, agricultural and monitoring wells near its remediation fields, as well as soils and plants in the fields, to determine if increases in uranium occur. If domestic wells near PG&E ATUs experience increases in uranium due to PG&E's remedial pumping, then PG&E must provide the well owners replacement water. If significant increases over baseline levels of uranium in soils are detected through required monitoring, then PG&E must propose an action plan to reduce those increases.

   Further, PG&E is required to conduct an investigation of potential agricultural remediation byproducts, including uranium, to try to determine if its past agricultural treatment is affecting uranium levels (this is specified in the EIR's Mitigation Measure WTR-MM-5, which is also included as requirement in the ATU permit). If it is determined that agricultural treatment is affecting byproduct levels, then increased monitoring, replacement water for any affected wells, and restoration of water quality in the aquifer to pre-project levels following remediation are required.

It should be noted that remedial agricultural units operate exactly the same as non-remedial irrigated agricultural fields, which have existed in Hinkley since the 1920s. Thus, if it is shown that agricultural treatment is affecting uranium levels (by mobilizing natural uranium), then current agricultural activities (not related to PG&E's remediation) outside the chromium plume, as well as historical agricultural activities throughout Hinkley Valley, are also likely to have affected uranium levels.

3) The Water Board investigated uranium levels in the Hinkley aquifer through collection of existing data and through a November 12, 2012, request to PG&E for their information (Investigative Order No. R6V-2012-0057). In response to Order No. R6V-2012-0057, PG&E submitted a *Radionuclide Data Summary Report* on November 30, 2012 (available on Geotracker at http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL0607111288).

   PG&E collected limited radionuclide groundwater samples for wells associated with agricultural irrigation supply, freshwater supply, and its domestic well sampling program. Data from agricultural unit supply wells and other sampling indicated total uranium levels of 25 to 59 pCi/L, 27 to 81 pCi/L for gross alpha and below 4 to 27 pCi/L for gross beta. Upper aquifer monitoring wells had total uranium levels from 3 to 32 pCi/L, 7 to 34 pCi/L for gross alpha and 6 to 9 pCi/L for gross beta. Lower aquifer monitoring wells had dissolved uranium levels from 1 to 2 pCi/L, 3 to 4 pCi/L for gross alpha and less than 4 to 5 pCi/L for gross beta.

   Uranium data was also collected from sources other than PG&E. San Bernardino County Department of Public Health provided copies of sampling results for two Hinkley area water systems permitted by San Bernardino County in which uranium levels ranged from 4.5 to 21.4 pCi/L in 2011 and 2012 samples. The Maximum Contaminant Level (MCL) set for uranium is 20 pico curies per liter (pCi/L). The MCL for gross alpha is 15 pCi/L and for gross beta is 50 pCi/L.

To summarize, it is established by various sources that groundwater in the Mojave Desert and the Hinkley area contains uranium and other radionuclide levels that are above their respective MCLs, as you note in your correspondence. The Water Board has disclosed and discussed this information, and this information is readily publically available. However, the Water Board does not have information that uranium is the result of unauthorized waste discharges by PG&E or others. To the extent that PG&E's remediation actions may mobilize uranium to areas where it could impact domestic wells, the Water Board uses its regulatory authority to require monitoring and investigation, replacement water in some cases, and clean up or remediation, if needed.

Arsenic

Arsenic is also a naturally occurring element in Mojave Desert soils and groundwater. The US Geological Survey conducted sampling for various constituents in wells in the Mojave Water Agency management area from 1991 to 1997, including wells in the Hinkley area. Naturally-occurring arsenic concentrations in water from wells in the

western Mojave Desert commonly exceed 10 parts per billion (ppb) and some exceed 100 ppb. Along the Mojave River upgradient of the PG&E compressor station, the USGS study found arsenic in wells (up to 200 feet in depth) ranging from less than 1 ppb to 12 ppb with most concentrations under 10 ppb. North of Highway 58, the USGS study found arsenic in one well at a concentration of 52 ppb.

Water Board staff acknowledge that in-situ remediation actions (e.g., addition of ethanol to groundwater) conducted by PG&E in the area south of Highway 58 can temporarily mobilize naturally-occurring metals, including arsenic, into groundwater. Therefore, the Water Board, in its remediation permits issued to PG&E, requires monitoring and mitigation measures to ensure that such mobilization does not impact domestic wells, described below.

Starting in 2004, PG&E began pilot-testing in-situ zone (IRZ) remediation actions near its compressor station. Pilot testing involved the injection of two food-grade organic substrates (emulsified vegetable oil and sodium lactate) into groundwater to create conditions in which dissolved hexavalent chromium in groundwater is converted to solid trivalent chromium, effectively removing it from groundwater and sequestering it in aquifer sediments. The Water Board issued waste discharge permits for this pilot testing (and subsequent expanded-scale actions) in 2004, 2006 and 2008. These permits were accompanied by publically available environmental documents which disclosed that such injections would liberate and temporarily mobilize naturally-occurring metals such as arsenic, manganese and iron (called in-situ byproducts) from the aquifer soils, and specified extensive monitoring and mitigation measures to ensure that such byproducts would be contained within project boundaries and not reach domestic wells. The 2013 EIR also describes the potential for IRZ byproducts to increase in the aquifer temporarily (see impact discussion starting on EIR page 3.1-100).

As described above for uranium, if it is determined that IRZ byproducts such as arsenic may affect domestic wells, then replacement water for such wells, and restoration of water quality in the aquifer to pre-project levels in the future are required (see mitigation measures discussion starting on EIR page 3.1-109, particularly mitigation measures WTR-MM-2, -2b, -4, and -7).

Monitoring data from over six years of IRZ operation, including a byproducts investigation conducted in 2012-13, indicates that byproducts generated in the IRZ: 1) travel in the direction of groundwater flow (generally northward); 2) lessen or attenuate within project boundaries back to threshold concentrations, and 3) have not affected nearby domestic wells. Of the three dissolved metal byproducts, monitoring data indicate that manganese typically travels the farthest in groundwater compared to iron or arsenic. Groundwater movement tracer tests related to the 2012-13 investigation are still ongoing, but preliminary data from those tests support the conclusion that IRZ byproducts have not left the project area and therefore are not affecting nearby domestic wells.

Monitoring of approximately 35 domestic wells located near ATUs and IRZs for remediation byproducts is ongoing on a quarterly basis. Data from this monitoring is shown in ATU Groundwater Monitoring Reports, submitted quarterly on February 20,

May 20, August 20, and November 20 of each year. These reports are available on Geotracker at the web address noted above. IRZ quarterly monitoring reports are submitted January 15, April 15, July 15, and October 15 of each year and are also available on Geotracker.

In summary, Water Board staff has disclosed and discussed numerous sources of data regarding arsenic and uranium in the Hinkley area, and continue to require PG&E to monitor for those constituents in waste discharge permits issued for ATU and IRZ operations. Monitoring requirements are set for domestic and monitoring wells, irrigation wells, soils, and plant tissue samples. These requirements and resultant data are readily available online, or by requesting to review the Water Board's hardcopy files (see http://www.waterboards.ca.gov/lahontan/resources/public_records/index.shtml for information on Public Records Act requests).

II. PROPOSED CLEANUP AND ABATEMENT FOR WASTE CHROMIUM DISCHARGES

You are also concerned that Water Board's proposed 2015 Cleanup and Abatement Order requiring PG&E to cleanup chromium contamination due to historical releases from its Hinkley Compressor Station does not mention arsenic and uranium levels. The proposed CAO, released for public comment from January 21 to March 13, 2015, is available at http://www.waterboards.ca.gov/lahontan/water_issues/projects/pge/cao/.

As described above, the Water Board does not have evidence that PG&E's actions, either historic or current, have resulted in unauthorized waste discharges of arsenic or uranium to the groundwaters of the Hinkley aquifer or domestic wells. Therefore, it is not necessary or relevant to discuss arsenic or uranium levels in the proposed CAO. Unauthorized waste discharges of total and hexavalent chromium did occur as a result of compressor station operations in the 1950s and 1960s, and those discharges are the appropriate subject of the CAO. Further, and as described above, the Water Board, through its two permits authorizing chromium remediation activities, is requiring ongoing monitoring of arsenic and uranium to track changes due to PG&E's remediation activities and to require corrective actions when needed.

III. OTHER ISSUES RAISED IN CORRESPONDENCE

Allegations of Bias

In your May 7, 2015 letter, you state that the Water Board "should refrain to utilize any study by the USGS, on the grounds that Dr. Izbicky (sic) from USGS was paid by Pacific Gas and Electric Company, over $4 million, and therefore any such study will be legally construed as biased." You also state that the "so-called IRP Manager controlled by the private company Project Navigator, LLC, paid by Pacific Gas and Electric Company, is hereby construed by The People, as totally biased organizations (sic) . . . and must not be promulgated nor proclaimed . . . as performing task (sic) for the Community of Hinkley."

Regarding the Hinkley chromium background study conducted by Dr. Izbicki of the USGS: Dr. Izbicki's involvement in the background study came about, in large part,

through numerous requests to the Water Board and contacts to Dr. Izbicki by Hinkley residents who were adamant that any chromium background study should be conducted under the direction of the USGS, an unbiased, non-regulatory federal agency. The USGS, and Dr. Izbicki in particular, has unique expertise on the occurrence of chromium in aquifers of the Mojave Desert, and has developed specialized techniques to investigate the sources of chromium in groundwater. The Water Board and PG&E share the Hinkley residents' desire to leverage the unbiased expertise of the USGS in determining background chromium levels in the Hinkley Valley.

Funds for the USGS background study were deposited by PG&E into a trust account held by the State Water Resources Control Board. This allowed the Water Board to enter into an independent contract with the USGS to develop workplans and conduct groundwater investigation activities in the Hinkley area to assess background levels of chromium in groundwater. Water Board staff oversee the contract with the USGS, and the State Water Board issues payment to the USGS once Water Board staff approves USGS's invoices for work. PG&E has no role whatsoever in the disbursement of actual payments to the USGS for the background study work. Once PG&E's funds were deposited into the State Water Board's trust account, those funds became under the sole control of the state of California, and PG&E has no control or influence over the disbursement of such funds.

Water Board staff have gone to great lengths executing the contract with the USGS to ensure that the results of the background study are unbiased, acceptable to the community, and based on the best available science, methods and analysis.

Regarding the Independent Review Panel (IRP) Manager, Project Navigator: Project Navigator staff is under contract to PG&E, and paid by PG&E directly. However, members of the Hinkley community, primarily through the Hinkley Community Advisory Committee, provide input on the scope of work each year. Project Navigator's work products are developed in collaboration with the Hinkley Community Advisory Committee. Project Navigator's primary role is to provide technical assistance to Hinkley residents, so they may understand and provide comments on many items, including reports from PG&E and orders from the Water Board.

Request for Government Employee to Witness Sampling

In an email dated May 4, 2015 and letters dated April 30 and May 7, 2015, you request that a government employee (assuming to be Water Board staff) be present to witness sampling conducted by you of the Hinkley aquifer at up to 35 locations, including private property (assuming at residents' drinking water wells); and you also state that the Board must order testing of 35 injection-extraction-monitoring wells operated by PG&E for unfiltered arsenic and uranium.

Individual private well owners are responsible for conducting sampling of their own wells or authorizing access to others for the purpose of conducting the sampling. Sampling of monitoring wells constructed and owned by PG&E, must be done only by PG&E or others with permission and authorization from PG&E. Anyone accessing PG&E monitoring wells without PG&E's permission is committing an illegal activity.

We note that under current monitoring requirements issued to PG&E, analysis for arsenic and uranium are run as "dissolved" concentrations. Samples collected from wells by PG&E are filtered before analysis to remove any solids that may interfere with sample analysis (the USGS uses this same procedure). This is the appropriate method for assessing contaminant levels in an aquifer.

As described above, sampling for arsenic and uranium is ongoing (and has been occurring for some time) at domestic, monitoring, and remediation wells in Hinkley. Water Board staff rely on data collected by PG&E's consultants under its various Water Board-issued permits, cleanup and abatement orders, and investigative orders. PG&E is required to follow quality assurance/quality control protocols and use professionals and laboratories licensed by the state of California to collect and analyze data, and must report its results under the penalty of perjury. At this time, we do not see the need to duplicate PG&E's monitoring of their remediation wells.

The State and regional water boards do not sample private domestic wells. If it is determined that sampling of private wells is necessary as part of an investigation of potential contamination by a human activity, the water boards will require sampling by the discharger's consultant, and generally would not conduct the sampling itself. Private well owners are responsible for sampling (or hiring professionals to sample) their own wells. We do not have the resources to oversee a private effort such as yours to conduct domestic well sampling when there is no evidence to suggest illegal discharges of waste have occurred. For more information on sampling your well, please see "A Guide for Private Domestic Well Owners" produced by the State Water Resources Control Board, revised April 2011, found at this web address: http://www.waterboards.ca.gov/gama/docs/wellowner_guide.pdf

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